
Appendix D. CRASHPC and OLDMISSPC Summary

CRASHPC is an acronym for Calspan Reconstruction of Accident Speeds on the Highway. As its name implies, the CRASHPC program is a general-purpose personal computer program that can be used to estimate vehicle speeds in real-world crashes, based on physical evidence obtained by a crash investigator. The objective of the CRASHPC program is to provide a standardized and objective means of interpreting the physical evidence from the scene of an automobile collision.

Two separate and independent methods can be used to estimate the change in vehicle speeds experienced by the vehicles. The first method makes use of trajectory data and is based on work-energy relationships and the principle of conservation of linear momentum. The other method makes use of detailed measurements of the structural deformation of each vehicle to arrive at an estimate of the energy required to produce the observed vehicle damage. These two methods can be used to check each other, since they should yield similar results if the user possesses sufficient information to use both methods fully.

The CRASHPC program is a simplified mathematical analysis of automobile crash events. As is the case with any such analytical procedure, certain assumptions have been made to reduce the complexity and the operating cost of the program. In some particular cases, CRASHPC is not, nor was it intended to be, a high-fidelity collision simulation program. In most crashes, only a minimum of data are available, and even these data are only available second hand.

Beyond its use by Federal Government sponsored researchers, CRASHPC has become a popular tool among reconstructionists involved in litigation, and much of the criticism of the CRASHPC program regards its accuracy in such applications. CRASHPC was intended as a statistical tool to identify and isolate problems in motor vehicle safety, not as a simulation program, and it should be used accordingly. Often, accuracy problems are the result of applying the CRASHPC program in situations which violate, to some degree, its fundamental assumptions:

- ! It is a two-dimensional program.
- ! It simplifies the characteristics of vehicles.
- ! It assumes that at some instant during the impact both vehicles have a common velocity.
- ! It assumes that the vehicles spin out to rest with constant rolling resistances, no active steering, and over a single friction surface (a secondary friction surface may be specified in the trajectory simulation).

The above assumptions mean that the program cannot be used for: rollovers; sideswipes; severe override/underride crashes; nonhorizontal collision forces; or collisions with large trucks or trains in motion, yielding objects, or pedestrians, bicyclists, or motorcyclists.

The missing vehicle algorithm (OLDMISSPC) methodology is based on CRASHPC.